This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

600030172J

22

BOUT THE SKIN.

TH DIAGRAMS.)

BY

NEALE, M.B., &c.,

OF MANCHESTER SKIN HOSPITAL,

HYDE ROAD.

PRICE TWOPENCE.

[illegible]

FACTS ABOUT THE SKIN.

(WITH DIAGRAMS.)

BY

A. J. NEALE, M.B., &c.,

PHYSICIAN TO THE MANCHESTER SKIN HOSPITAL,
HYDE ROAD.

PRICE TWOPENCE.

JOHN HEYWOOD,
DEANSGATE AND RIDGEFIELD, MANCHESTER;
AND 11, PATERNOSTER BUILDINGS,
LONDON.
1884.

SEWED IN COVER. PRICE TWOPENCE.

THE TEETH,

AND HOW TO PRESERVE THEM.

(WITH DIAGRAMS.)

BY

CHARLES HOLMES, M.D., BRUX.;

L.R.C.P., LOND.; M.R.C.S., ENG.

SEWED IN COVER. PRICE THREEPENCE.

THE DRESS OF WOMEN AND CHILDREN.

A LECTURE

Delivered at the Association Hall, Peter Street, Manchester, January 30th, 1884.

BY

W. N. MACCALL, M.D.,

PHYSICIAN TO THE CLINICAL HOSPITAL FOR WOMEN AND CHILDREN.

BODLEIAN LIBRARY
1 SEP 85
OXFORD.

SEWED IN COVER. PRICE TWOPENCE.

THE DRESS OF WOMEN AND CHILDREN.

A PAPER

Read before the North-Western and Yorkshire Associations of Medical Officers of Health, at the Town Hall, Halifax, on May 8th, 1884.

BY

FRANCIS VACHER,

MEDICAL OFFICER OF HEALTH FOR BIRKENHEAD.

SEWED IN COVER. PRICE SIXPENCE.

ON THE DISTRIBUTION OF DEATH AND DISEASE.

BY

ARTHUR RANSOME, M.D., M.A., F.R.S.,

Lecturer on Public Health at the Owens College, and Examiner in Public Health to the Victoria University;
Chairman of the Committee of the Manchester and Salford Sanitary Association.

JOHN HEYWOOD, Deansgate and Ridgefield, Manchester; and 11, Paternoster Buildings, London.

FACTS ABOUT THE SKIN.

(WITH DIAGRAMS.)

BY

A. J. NEALE, M.B., &c.,

PHYSICIAN TO THE MANCHESTER SKIN HOSPITAL,
HYDE ROAD.

JOHN HEYWOOD,
DEANSGATE AND RIDGEFIELD, MANCHESTER;
AND 11, PATERNOSTER BUILDINGS,
LONDON.
1884.

16663. e. 3

BODLEIAN LIBRARY
1 SEP 85
OXFORD.

PREFACE.

I have written this pamphlet not with the idea of giving directions for the treatment of skin diseases, which ought not to be attempted, except under the personal supervision of a medical man, but rather by describing the structure of the skin and by pointing out the importance of its duties, to draw the attention of my readers to the care which should be bestowed upon it in health, which would render possible that prevention of disease which is proverbially better, as it is easier, than cure.

Exchange Buildings,
Manchester.

FACTS ABOUT THE SKIN.

THE skin is at once one of the most important and one of the most neglected organs of the body. Most organs have functions beyond those which specially demand their existence, but none serves so many purposes as the skin. It possesses, moreover, this pre-eminence that, while chronic disease may and does attack internal organs without causing much discomfort to the sufferer, it cannot appear on the surface of the body without proclaiming its presence to all the world and bringing down on its unhappy possessor remarks which, however sympathetic, cannot be other than unpleasant. Indeed, the sympathy with which a skin disease is regarded is, in many people, largely mingled with disgust. A certain disagreeable feeling comes over the mind on looking at an individual suffering from such an ailment, which, I think, is due to a prevalent idea that the possession of such a blemish indicates some moral failing in the sufferer, or at least in some of his ancestors; and spectators draw themselves together with a virtuous pride that there is nothing of the sort in *their* family. Yet this is a most absurd fancy. Undoubtedly dissolute habits bring skin affections in their train; yet, were we to accuse of immorality all or even half of those who suffer from such diseases, we should lay undeserved blame on some of the noblest and purest among us. A proper appreciation of the functions of the skin, not only of those which belong wholly to itself, but of those which depend for existence partly on other organs, will demonstrate how easily it may undergo change both in disease and health, and how apt it is to suffer by proxy.

I have just spoken of the skin as an organ. The ultimate molecules of which the body consists are put together so as to form what we call tissues, muscular, bony, or membranous in nature; and, when a number of different tissues are so aggregated as to form a complete whole which has a definite function, they make what is termed an organ. As I shall show further on, the skin is made up in this way. The whole body is enclosed in skin;

but this has not the same thickness, texture, or use in all parts. Thus, the skin of the scalp is similar in texture to that of the arms, but, being adapted for the growth of hair in greater strength, quantity, and length, the external appearance of it is wholly different. The skin which covers the lips is apparently unlike that of the body elsewhere, but the changes by which the outside skin of the face becomes the inside skin of the lips are so imperceptible that we can draw no exact line of demarcation to say where one begins and the other ends. The nails, too, are merely a modification of the skin of the hands and feet, their essential parts being the same. This extensive adaptability of the skin is brought out more clearly under other demands, as is shown in the case of corns. Corns are not usually considered to be demanded by the human race; but they are really Nature's reply to a want expressed by the skin. A tight or ill-fitting boot pressing on some prominent part of the foot renders the skin uneasy, and would ultimately produce a raw place if there were not a provision for such emergencies. Under the gradual irritative stimulus the skin begins to throw up layer upon layer of cells, thickening itself to such an extent that a protective surface is offered. With this comes increased pain; but the skin has done all it can to protect itself, and, having called its owner's attention to the infringement of its rights, leaves him to take the next move. Suffering humanity now puts on a loose boot, and the original corn becomes more endurable, while perhaps others develop elsewhere. The cause of this is the unequal pressure now put on the foot, and first one part of it and then another becomes chafed as its owner acquires the habit of walking on different surfaces. Had the boots fitted well to begin with, and been neither too tight nor too loose, there would have been no corns; but, unfortunately, we are under the dominion, first of fashion and secondly of the bootmaker, and till very recently neither factor took any account of the laws either of anatomy or of nature. A natural protection, somewhat analogous to a corn, exists in the pads provided for the knees of the camel to protect them from the abrasion which would otherwise result from their constant use.

The skin possesses a peculiar interest as giving a key to the emotions, as exemplified in blushing and pallor. But though a blush is an index to emotion, the same emotion may not call up a blush in two individuals. People are thus often rudely characterised as thick-skinned or thin-skinned, according to the readiness or the reverse with which their emotions are called into play; and there is perhaps something really physiological in this. For as blushing and pallor depend on the filling or emptying of the vessels of the skin, the literally "thick-skinned" man is not so apt to show those changes through a dense layer of epidermis. Blushing is not confined to the face and neck, but may extend over the whole body, and in some nervous diseases small spots here and there may be affected in a like manner.

The facial skin affords another index to the mind of man in the deep lines observable about the forehead, cheeks, and mouth. These are primarily produced simply by the contraction of the muscles, but when the muscles have been frequently used to express emotion, the constant repetition leaves an indelible fold in the skin. The horizontal lines on the brow speak of care, the vertical lines of anger, the straight firm line of the oral muscle of stern decision, whilst we associate a slight turn of the same line up or down with a mood pleasant or the reverse.

THE USES OF THE SKIN.

The uses of the skin are as follow: (1) To act as an external support to the soft structures below. (2) To carry off a large share of the waste products of the body. (3) To allow sensations from the outer world to reach the thinking organs. (4) To protect the system from extremes of heat and cold.

First, *as a supporting structure.* The muscles of the body are attached by either end to bones, and the organs are supported, some by bony casings, some by ligaments which sling them to the bones, but all are bound together by the skin, and thus preserved from contact with the outer air. The value of the skin as a support has been largely recognised in the treatment of some ulcers in which the blood-vessels, deprived of their natural protection, lose their tone, become flabby, and produce an exuberant, unhealthy growth known as "proud flesh." If the place of the skin is taken by such artificial support as a firm bandage, carefully and equally applied, the superabundant flesh becomes atrophied, and the ulcerated part being depressed to the level of the surrounding skin allows the latter to creep down and gradually to resume sway over its lost territory.

Secondly, *as a drainage system for waste products.* There is exhaled from the healthy skin a waste product which we call perspiration, and which is of two kinds—insensible and sensible.

The first is a watery vapour containing volatile matter of whose presence we are normally unconscious, while the second differs from this only in being in a condensed form which remains as moisture on the skin. The relative quantities of insensible and sensible perspiration depend on the state of the atmosphere. The hotter and drier the air, the less perspiration collects on the skin; and, conversely, a moist, cool, and stagnant air allows perspiration to remain on the body as sensible. Since (as the name "sensible" implies) we are conscious of its presence, we often seem to be perspiring greatly when there is not really more sweat produced than usual, but less of the sensible has been converted into insensible. Nevertheless, the rate of secretion may be so rapid that no air, however hot and dry, can convert sensible into insensible sweat so rapidly as to make us unconscious of its presence. The total amount of perspiration secreted in twenty-four hours is reckoned at about 32 ounces, of which solid matter constitutes only 1·8 per cent. This solid matter consists chiefly of sodium chloride, fatty acids, neutral fats, and ammonia. In exceptional states of the system, other elements are found in the sweat, *e.g.*, blood, bile, sugar, and some medicines.

Thirdly, *as a seat of sensation.* Next to the eye, the skin ranks as the most valuable means of conveying to our minds impressions from the world around us. These impressions are not so far-reaching as those brought by the eyes, nor so keen as those which reach the ears in sound, yet they influence us more nearly, for they allow us to appreciate everything that comes in actual contact with us. The school-book order of the senses runs thus: hearing, seeing, smelling, tasting, and feeling; but in actual life, feeling or sensation ranks first. The sensations conveyed through the skin are most powerfully apprehended by the fingers, how much so only those who have lost the use of their digits can properly understand. Close your eyes, and lay your hand on anything, and immediately you know its shape, size, and substance, and whether it is living or dead—a mental image of the object is formed. Of course, to most of us such an image is merely recalling by touch a thing we have once seen; but even without previous acquaintance by sight the hands may be educated to recognise anything that they have touched before. A blind man has as perfect a sensation of the materials he has used in basket-making, and of the basket made, as any one who has watched the process of manufacture and merely closes his eyes to recall them to the mind by touch;

and he can tell, without sight, if his hands rest on stone, wood, metal, or any other substance. The sensation of recognising material is not confined to the hands. We can tell such things by laying the face on them, and can even perceive their nature through thick clothing. The power of sensation existing in the fingers may be brought up to the highest point of development by education, as may be exemplified by the violin player, who keeps his eyes on the sheet of music while his fingers do all the labour; by the Scotch fish-wife who goes through the town crying her fish and knitting a stocking, all the while without a glance at her work; or by the surgeon as he feels for the presence or alteration of the well-known lines of the body, with his eyes fixed on the face of the patient ready to catch the faintest clue as an index to pain.

In all these things the sensations lodged in the skin are the moving powers, but they are aided and guided by other faculties. In the matter of feeling for notes on the violin there is also called into play a sense of weight, which lies not in the skin but in the muscles, and allows the exact amount of pressure to be put on the string, and also a sense of judgment in putting down the finger at the exact place which will bring out a pure note; the same sense of judgment is used in throwing a quoit or striking a billiard ball. But these sensations, while they act in conjunction with the skin, are dependent on it, for it is through it that they are excited.

The skin is sensitive to external impressions throughout its whole surface, but the accuracy of judgment in the position of such sensations is not equally distributed. Experiments have been made with a view to testing the sensitiveness of the skin to perceptions in different parts—that is, the power of localising the touch of two points so distinctly as not to confound them into one point. If a pair of compasses is opened, and the two points laid at the same moment on the skin of the back, it is found that the points must be opened to a distance of 66 mm., to give to an ordinary person the sensation of being touched at two points. If the compasses are open to a less extent than 66 mm., it is not possible for him to say accurately whether one point or both is touching the body. But, in the tips of the fingers, we can distinctly tell that we are touched at two points if the compasses are open only to a distance of 2 mm., and the rest of the skin varies in its keenness between these extremes. Thus the skin of the nose is more sensitive than that of the cheek, and the cheek than that of the chest. These perceptions, like all others, can be greatly increased in intensity by being exercised at intervals. There are parts of the back which can be tickled without the tickled subject being able to point out the exact spot and rub away the irritation, he has to feel gradually for it; but, on the face, any irritation can be localised at once. Let a fly alight on the cheek and immediately the hand darts up and goes with unerring accuracy to the irritated spot to remove the fly; the mark is never missed, because the sensitiveness of the cheek is so highly developed in all parts. If flies had as easy access to the skin of the back as they have to the face, sensation would soon become as highly developed in one part as the other.

Skin sensations are not confined to the simple appreciation of touch; we can tell at once if the object touched be hot or cold, sharp or blunt; but the keenness of the sensation is lost if the pressure is kept up continuously. For a sensation to be perfectly recognised it must not be continual, but repeated at short intervals. The pressure of a ring on the finger is not felt at all when it is constantly worn, but if it were changed every hour from one finger to another we should never cease to be conscious of its presence. The sensation of touch in the feet is so keen as to enable us to detect the nature of the substance on which we are walking, whether carpet, pavement, or grass, and this without the aid of the judgment which would be given by the sound of the footfall.

Fourthly, *as a protection against extremes of heat and cold.* The blood-vessels of the skin, like those throughout the body generally, are elastic and muscular in their nature, and are capable of expansion and contraction in their whole lengths under the control of the central nervous system. When the skin is exposed to a warm temperature it becomes reddened by the dilation of innumerable small vessels, and the larger quantity of blood being circulated close to the air, allows the body to cool down. If the action of heat be suddenly changed for that of cold, the skin vessels immediately contract, so that, less blood being exposed to the air, the warmth of the body is retained. This power of contraction and dilation of the blood-vessels answers a purpose similar to that which locks do in a great canal system. If more blood than usual is required by any part of the body, the vessels of other parts accommodate it by reducing their calibre whilst its own vessels expand. For example, during digestion the vessels of the stomach, liver, &c., are dilated and hold more blood; during mental exercise the brain holds most, while during sleep, when the brain is not required for active work, it becomes comparatively destitute of blood. This fortunate provision in the cutaneous vessels, which does so much to regulate the temperature of the body, may be cultivated to a high pitch or allowed to fall into a very feeble condition. The latter case is very common in those who, being accustomed to live in too hot rooms, have their cutaneous vessels in a constant state of relaxation, and, if suddenly called upon to brace themselves up to meet a draught, fail entirely or partially to react, and so "take cold." If two men, one in good health and the other delicate, pass from a hot theatre or church into the cold air without donning extra clothing, the first experiences small sense of change—at most a slight shiver. He remarks that it is cold, and nothing further ensues. His companion feels a severe shivering, and is chill all the way home. The first man's shiver is merely corrective, and has called into action the contractile power of his skin vessels; whilst that of the second is Nature's protest against her outraged feelings, and becomes an ineffectual effort to maintain the balance of temperature in the body, which fails entirely unless assisted by an overcoat or a muffler. The chances of cold being acquired as a result of sudden change of temperature are very much lessened in those who accustom their vessels to act quickly, such a result being best attained by the habit of daily ablution in water, cold or nearly so, whether practised in the bath or as a simple sponge down, followed in either case by rapid drying. Every man does not possess health sufficiently good to allow him to take a daily cold bath, but most do. At the first attempt some shivering will follow, and even those who have been accustomed to it for years experience occasional shivering; but every shiver does not imply that a cold will result from it, for it is not so much an indication that the system is lowered, but rather that if the conditions causing it are quickly altered no harm will ensue. A shiver is a warning, and if its demands be complied with—the towel applied at once and warm clothes soon put on—all the good that can be extracted from the bath is acquired, and its evil effects are avoided. If a person feels *severe* shivering after a bath, he may make up his mind either that the bath is not meant for him or that it has been too prolonged.

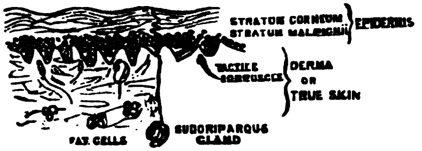
Here it may be worth while to mention the effect of alcohol on the skin. The first effect of taking brandy, whisky, or any strong form of alcohol is to dilate the vessels of the skin, and so diffuse a glow and sense of warmth throughout the body, but then so much blood is exposed to the air that the body is rapidly cooled on the surface, and an after chill results. This fact has been particularly recognised by explorers of the Arctic seas, who persuade their men to give up their allowance of alcohol, and thus save animal heat. Coming to a point which touches us at home more closely, everybody knows how often doctors recommend persons advanced in life to take a little hot toddy at night immediately before going to bed, but perhaps everybody does not know the reason. It is to take advantage of the power possessed by alcohol to dilate the skin vessels. Old persons do not so readily sleep as young ones, and complain that it is long before they get warm in bed, which is one of the first conditions of sleep. During sleep, as I have mentioned, the brain becomes comparatively bloodless, as it requires much less feeding than when employed in mental work, and the blood is principally accommodated in the skin. Therefore, if we artificially dilate the vessels of the skin with alcohol, the brain is consequently less supplied with blood, and if that opportunity be taken for rest, sleep will generally follow. But a man may take as much alcohol as he likes, until he gets muddled, and never obtain sound sleep if he miss the right time for it, before the vessels contract again and the body cools. He should take a moderate quantity of alcohol, in order to heat the skin for a short time, and keep up that heat by the additional clothing which the bed supplies.

People who take an after-dinner nap constantly find that they take cold, but it is perfectly possible to sleep in the daytime without doing so. Remembering how the brain becomes relieved of blood during sleep, and how the skin accommodates much of this blood and exposes it to the cooling influence of the atmosphere, it is necessary to provide against such loss of warmth by wearing more clothing, just as would be done at night; and if during a day sleep the slumberer would begin by throwing a thick rug over him he would retain his heat, and sleep would follow without the disagreeable resulting cold.

Though the skin is the most important, it is not the only organ upon which the body depends for the retention or dissipation of heat. If necessary the lungs can be brought into active work. The more quickly we breathe (if the amount of air inspired at each breath be equal) the more air is supplied to the hot blood in the lungs, and consequently more heat is lost to the body in the same time. In dogs, whose skin is protected with thick hair and does not lose heat so rapidly as man's, advantage is taken of the lungs to cool the body; and when the animal is hot he opens his mouth, lolls out his tongue, and takes quicker and deeper breaths. The average temperature of the body varies from 98·4 to 99° Fahr. It is lowest in the morning, between half-past one and half-past seven, and is highest from nine in the morning till six at night. "Sex, race, latitudes, seasons, weathers, and habits go for very little in influencing the temperature of healthy persons," so delicate is the balance preserved in the body to meet the changing conditions of life.

STRUCTURE OF THE SKIN.

Roughly speaking, we may be said to possess three skins. Let us examine a section of the skin under the microscope. A section may be obtained by means of a knife contrived for the purpose. It consists of two blades placed side by side and adjusted by means of a screw which separates or approaches the blades as desired. The blades must be approached to a minute degree to furnish a cutting of the skin thin enough for our purpose. The knife is drawn across the skin of any part, and the section it brings away between its blades can be placed on a glass slide for examination. Looking at it through the microscope we see at once that there are three distinct appearances in one section, and it is better, perhaps, to premise what these are called. The first layer—that is, the part exposed to the air—is the *Stratum corneum*, or scarf-skin; the middle layer is the *Rete Malpighii* (a network of cells called after its describer); and the innermost layer is the *Derma*, or true skin. The tissue below this, a bit of which is sure to be included in one section, is the subcutaneous fat on which the skin rests. The first two layers—that is, the *Stratum corneum* and the *Rete Malpighii*—are together known as the



Scheme of the three sections of the Skin.

Epidermis, because they lie on the *Derma*, or true skin, beneath. The first layer—the scarf-skin—consists of little bodies, like a wall of plates, closely packed one above the other, becoming more flattened as they near the surface of the skin, but opening out and taking a more polygonal shape towards the *Rete*.

The second layer, or *Rete*, consists of little bodies or cells of a globular form, which have small processes on their surface to fit into each other, some are more cylindrical in form, and all possess tiny dots in their centres called a nucleus. It is this layer which contains the pigment or colouring matter of the skin, in the form of little granules lying about the nuclei. An Albino possesses no pigment in his *Rete* cells. In the negro the quantity is enormous, and in the white man it varies greatly. During pregnancy it often occurs that large deposits of pigment occur in patches in different parts of the body, and there is a disease where the contrary occurs, patches as large or larger than a crownpiece become entirely destitute of pigment, and show out on the body with a startling whiteness. The third layer, called the *Derma*, or true skin, is very different from the two last. It is made up of a quantity of fibres, which, by their interlacing in various directions, form a very dense tissue externally, but are more loosely woven within, where they are filled up with fat cells. The fibres are of two kinds—white and yellow; the white serve to give strength to the skin, whilst the last, being elastic, allow of the necessary stretching of the parts. The amount of elasticity imparted by the yellow fibres varies in different individuals. Everyone has noticed how the skin stretches as different muscles are used, and how, when it is at rest again, it contracts into minute folds. There is a case on record of a Spaniard who possessed so much ductility in his skin that he was able to bring the skin of the chin down to his chest like a beard, and could draw that of his right knee up and down for half a yard each way, but it was remarkable that he had no such power in the skin of the left side. After the skin was so pulled it would return to its place and lie as smoothly as on anyone else. The elasticity of the skin, like everything else in the body, diminishes with age, and, instead of lying smoothly when at rest, is creased into wrinkles permanently.

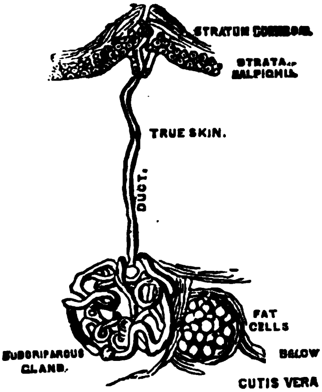
To return to the description. The *Derma* is not joined to the *Rete* by a smooth level line, but it projects itself into numerous elevations, or papillæ, and it is on the top of the papillæ and between them filling up their interstices that the *Rete* lies. The papillæ in some places exceed 60,000 to the square inch, so that this arrangement gives a much greater surface to the true skin, in the same manner that the actual surface of a hill is much greater than the surface of ground it stands upon. The other parts that go to make up the skin comprise blood-vessels, nerves, tactile corpuscles, and glands. Blood-vessels—that is, arteries to bring the freshly oxygenised blood from the lungs; veins to carry off the deoxygenised blood, and capillaries—which act mediately between them—exist largely in the true skin, and form junctions and plexuses in its papillæ, but do not penetrate into the *Rete* or the scarf-skin. Lymphatic vessels are abundant below the blood-vessels and also go to the papillæ. Nerves branch also in the true skin and end in various ways. Some terminate in bulbs, like an onion, and are known as paccinian corpuscles, but their function is still uncertain. Others follow the vessels and are lost on their coat; others send fine filaments right into the *Rete*. These are found all over the skin and constitute the nerves of common sensation—that is, they convey to the brain the sensations of pain, heat, cold, &c. Other nerves, again, terminate differently. They make their way to papillæ, which seem chosen for the purpose, and are usually destitute of blood-vessels, and here they end in oval shapes. The papillæ thus selected are the special organs of touch, and are consequently mostly found in the hand, where they are about one-fourth as numerous as the papillæ containing blood-vessels.

THE GLANDS OF THE SKIN

Are divided into (1) sudoriparous or sweat-bearing glands, and (2) sebaceous glands, which secrete a fatty matter.

THE SUDORIPAROUS GLANDS

Lie sometimes in the deep layers of the *Derma* and sometimes below it, in both cases sending a long tube to the surface of the skin, through which the sweat makes its escape. Each gland consists of a tube curled on itself like a ball, and is well supplied with blood-vessels around it, from which the waste material is drawn and thrown out on the body. The number of sweat glands has been estimated variously. Probably the nearest calculation is about two millions, but they are not equally distributed over the body, there being most on the hands, where they muster about 2,500 to the square inch. Supposing these tubes could be untwisted, and placed end to end, they would extend a distance of nearly eight miles. Of course their calibre is minute, but this immense length of perspiration tubing shows the extreme importance of their function. Were it to cease working, death would ensue.



Sudoriparous Gland.

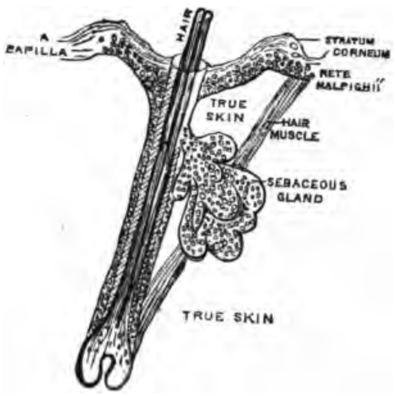
THE SEBACEOUS GLANDS.

These glands are everywhere distributed, but are not so numerous as the sweat glands. They have their seat in the true skin, and are mostly but not entirely associated with the hairs. They consist of one or more lobules or sacs opening into an excretory duct; the duct itself may either open into a hair follicle or pursue its course direct to the surface of the skin. These are the glands which are chiefly affected in the disease called acue, which is so commonly seen as large pimples on the face and back, where they form little collections of matter. The substance secreted by the sebaceous glands is oily in nature, serving to keep the hair soft and pliant like a natural pomade. When the glands are deficient in action, the hair becomes dry and harsh. Sometimes their function becomes excessive, and if this happens on the face the individual gets a greasy appearance. Or, again, the glands cells become torpid, and the secretion is not passed on to the surface of the skin, but collects and distends the gland, which at its opening forms a suitable spot for the collection of dirt. In this condition the sites of the glands become very evident, and are commonly known as "blackheads." When the blackheads are squeezed out and examined by the microscope, there are often found little parasites about a quarter of an inch in length, furnished with a distinct head, feelers, eight legs, and a tail, and recognised as the *Demodex folliculorum*. In the ears the sebaceous glands are modified in their use to produce the wax, and on the edge of the eyelid the secretion forms a protection to the thin skin against the irritation of tears, and also that adhesion of the lids which otherwise would take place under any slight inflammation.

APPENDAGES OF THE SKIN.

The nails are formed from the two layers of the skin which constitute the epidermis, and are good illustrations of the adaptability of the same tissues of the body to different ends.

The hairs are also a modification of the epidermis. They are found on every part of the body except the palms of the hands and the soles of the feet. On the eyelids they are exceedingly thick.



Hair and Follicle.

Each hair consists of three parts, just as does the skin. It is not a hollow rod, but solid; and cutting the hair does not expose an open tube. The central part, pith or medulla, consists of a number of cells loosely attached to each other. The middle layer, which is the thickest part of the hair, is made of fibres arranged longitudinally. The outer layer, called the cortex, is a series of little flattened scales, arranged like the tiles of a house, and all pointing towards the extremity of the hair.

Each hair is fixed in what is called a follicle; the follicle being formed by a dipping in of the skin right down into the *Derma*, and even below it, so that the root of the hair, which is embedded in a papillæ at the bottom of the follicle, is well protected from external violence. Into the hair follicle, about its middle, opens one of the sebaceous glands, which acts the part of an oil-can; just below the opening of the gland is fixed a tiny muscle, whose other end is attached to the surface of the *Derma*, so that during its contraction the hair is raised on end, and at the same time the exit of the sebaceous matter is favoured. A simultaneous contraction of these muscles produces the curious feeling described as "goose-flesh."

The colour of the hair has been thought to be occasioned by the presence of pigment which is found in the middle layer, whilst the disappearance of the pigment accounted for the presence of grey hair; but this is not absolutely correct. Probably the colour of the hair depends more on the relation of its structure to light.

A brown hair may be taken and bleached by the action of chlorine gas until it changes to yellow and then to white, and yet the dark pigment is still preserved within; whilst, on the other hand, dark hair may exist without there being any trace of pigment in the middle layer. Grey hair is not caused by a disappearance of pigment, but by a process of thickening taking place in its cortex, which becomes so dense that light cannot travel further inward but is reflected from the surface, just as from frosted glass.

To go further into the structure of the skin would be out of place in a popular pamphlet, but I think sufficient has been said to show that the skin should not be regarded as an undressed hide, but as a mechanism so intricate in detail, so varied in composition, so carefully adapted to the many ends it serves, that it deserves more attention than it usually receives from the majority of mankind. Its ill or well-being lies very much within our own control, and though diseased conditions will occasionally arise, they can readily be cured under proper and competent treatment, unless they have been aggravated by long-continued neglect or by ill-advised tampering with remedies whose action might be perfectly adapted to cases apparently similar, but would not suit that in question.

On the principle that prevention is better than cure, there is no better application for the skin than pure water, and plenty of it. This clears away all the waste matter which the glands bring to the surface of the body, prevents their being blocked by their secretion, and gives them plenty of room to carry on their work, thus cutting short half the causes which induce cutaneous disease. The brush and comb, if not too harshly applied, do the same good office for the hair, and washing must always be assisted by frequent changes of clean linen, or cleanliness becomes but one-sided.

One word about cosmetics. Knowing, as the reader does, how completely the skin is studded with minute pores, it will at once appear how absurd it is to apply powder to block them up, or washes which do not assist their action, but rather destroy it. The gain at the time is apparent, not real, and inevitably carries in its train a condition which is worse than the first. Powder once applied requires constant renewal, and a time soon comes when no repetition will restore to the skin the bloom of its pristine health, and the aid of the physician is sought in vain.

John Heywood, Excelsior Steam Printing and Bookbinding Works, Hulme Hall Road, Manchester.

Manchester Health Lectures for the People.

Published by the Authority of the Manchester and Salford Sanitary Association, 100, *King Street Manchester.*

FIRST SERIES.—13 Lectures. Crown 8vo, sewed, 1s. 6d.; Cloth, 2s. 6d.

Preface by Edwin Chadwick, C.B.

Introductory Address on Causes Reducing the Effects of Sanitary Reform. Daniel Noble, M.A., M.D.
Seeds of Disease. Arthur Ransome, M.A., M.D.
Foul Air and Lung Disease. A. Ransome, M.A., M.D.
Indigestion. W. J. Sinclair, M.A., M.D. Illustrated.
Some Invisible Agents of Health and Disease. R. Angus Smith, Ph.D., F.R.S.
Health, and How to Preserve It. John Haddon, M.A., M.D. Illustrated.
The Health of the Household. H. Simpson, M.D.
Pure Air, and its Influence on Health. A. Ransome, M.A., M.D.
Clothing, and its Relation to Health and Disease. John Haddon, M.A., M.D.
A Healthy Skin. W. J. Sinclair, M.A., M.D. Illus.
The Dwelling-House in Relation to Health. Henry Simpson, M.D. Illustrated.
Why Little Children Die. H. H. Vernon, M.D.
Adulteration of Food. C. Estcourt, F.C.

SECOND SERIES.—8 Lectures. Crown 8vo, sewed, 1s.

The Prevalence of Consumption in Large Towns, and How to Diminish It. Julius Dreschfeld, M.D.
Long Life, and the Causes that Prevent It. Arthur Ransome, M.A., M.D.
How the Body may be Influenced by the Mind in Sickness and Health. Henry Simpson, M.D.
Work and Recreation in their Relation to Health. S. Holgate Owen, M.D.
Defective Drainage as a Cause of Disease. Mr. J. M. Fox.
Good Nursing, and its Necessity in the Treatment of Disease. Dr. Irwin.
The Loss of Wealth by Loss of Health. Dr. Watts.
How a Tenant may Make his Cottage Healthy and Comfortable. Joseph Corbett, Esq.

THIRD SERIES.—8 Lectures. Crown 8vo, sewed, 1s. Series II. and III., in one volume, cloth gilt, 2s. 6d.

Alcohol, and its Hereditary Effects. H. Humphreys, M.A., M.D., M.R.C.P.
Personal and Household Arrangements in Relation to Health. J. Angell, F.C.S.
Health and Recreation in Childhood. W. N. Maccall, M.D.
Water: Its Work of Purification. A. Ransome, M.A., M.D. Illustrated.
Choice of Food. H. Simpson, M.D. Lond.
The Special Dangers to Health in Large Towns, especially in Salford. J. Tatham, M.D.
Ventilation of Houses, and Drainage. H. Ashby, M.B. Lond.
Day Nurseries, and their Bearing upon Public Health. J. M. Sutton, M.D., M.R.C.P.

FOURTH SERIES.—8 Lectures. Crown 8vo, sewed, 1s.

Cleanliness. A. Ransome, M.A., M.D.
Food: Quantity—Quality—Cooking—Hours. H. Ashby, M.D. Lond.
Clothing. John Haddon, M.A., M.D.
Beverages: Water—Tea—Coffee—Cocoa, &c. W. J. Sinclair, M.A. M.D.
The House: Site—Structure—Heating—Ventilating—Draining, &c. H. Simpson, M.D. Lond.
Food and Bodily Energy. Prof. Gamgee, M.D., F.R.S.
Infection: Its Nature—Precautions Against, &c. J. Tatham, M.D.
Sickness and Nursing. C. J. Cullingworth, M.R.C.P.

FIFTH SERIES.—9 Lectures. Crown 8vo, sewed, 1s. Series IV. and V., in one volume, cloth gilt, 2s. 6d.

Scarlet Fever and Diphtheria. P. Birch, L.R.C.P. Lond., M.R.C.S., &c.
Consumption, Its Causes and Its Prevention. A. Ransome, M.A., M.D.
Diseases Produced by Drink. A. Emrys-Jones, M.D. Edin., M.R.C.S. Eng.
Fevers: their Nature and Prevention. S. Holgate Owen, M.D.
Smallpox and Vaccination. John Scott, M.A. M.B., C.M.
Infant Feeding in Relation to Infant Mortality or, How to Feed an Infant. H. Ashby, M.D.
Colds and their Consequences. J. Dreschfeld, M.D., M.R.C.P.
Measles and Whooping-Cough. John Tatham, M.D., &c.
Typhus and Typhoid. Henry Simpson, M.D. Lond.

SIXTH SERIES.—8 Lectures. Crown 8vo, sewed, 1s.

On some Dangers connected with Dwellings. Arthur Ransome, M.A., M.D.
Warming and Lighting the Dwelling. John Angell, F.C.S., F.I.C.
Personal Care of Health. D. J. Leech, M.D., F.R.C.P.
The Food of the Household. Philip Birch, Esq., M.R.C.S., L.R.C.P.
Domestic Poisons. William Thomson, F.R.S., M. F.C.S., etc.
Clothing. John Priestley, Esq., M.R.C.S.
Thrift: Its Bearing on Health and Disease. Rev. G. W. Reynolds, M.A.
Cookery for the Household. Henry Simpson M.D.

SEVENTH SERIES.—10 Lectures. Crown 8vo, sewed, 1s. Series VI. and VII., in one volume, cloth gilt, 2s. 6d.

Breathing. A. Ransome, M.D., M.A.
Washing and Bathing. H. G. Brooke, B.A., M.B.
Drinking. John Angell, F.C.S., F.I.C.
Working. H. Tomkins, M.D., B.Sc.
Thinking. J. Dreschfeld, M.D.
Eating. J. Priestley, M.R.C.S.
Parents and Children. W. N. Maccall, M.D.
The Eye and Seeing. A. Emrys-Jones, M.D.
The Ear and Hearing. F. M. Pierce, M.D.
Sleep and Rest. Hy. Simpson, M.D

All the above Lectures can be had separately, 1d. each.

John Heywood, Deansgate and Ridgefield, Manchester; & 11, Paternoster Buildings, Londo

MANCHESTER SCIENCE LECTURES.

The Lectures in any of the Series may be had separately, Price One Penny, except the Eighth, which are Sixpence each.

FIRST AND SECOND SERIES.—22 Lectures. Crown 8vo, cloth, 346pp., 2s. 6d. The First and Second Series may be had separately, in Stiff Paper Cover, 1s. each.

Elementary Chemistry. 4 Lectures. Professor Roscoe, F.R.S.
Zoology: Four Plans of Animal Creation. 4 Lectures. T. Alcock, M.D.
Coal: Its Importance in Manufacture and Trade. Professor W. S. Jevons, M.A.
Elementary Physiology. 4 Lectures. John Edward Morgan, M.D. Oxon.

Coral and Coral Reefs. Professor Huxley, LL.D., F.R.S.
Spectrum Analysis. Professor Roscoe, F.R.S.
Spectrum Analysis in its Application to the Heavenly Bodies. W. Huggins, LL.D., D.C.L., F.R.S.
Our Coal Fields. W. Boyd Dawkins, F.R.S.
Charles Dickens. A. W. Ward, M.A.
The Natural History of Paving Stones. Prof. Williamson, F.R.S.
The Temperature and Animal Life of the Deep Sea. Dr. Carpenter, F.R.S.
More About Coal. How Coal and the Strata in which it is Found were Formed. Illustrated. A. H. Green, M.A., F.G.S.
On the Sun. J. N. Lockyer, F.R.S.

THIRD AND FOURTH SERIES.—17 Lectures. Crown 8vo, cloth, 322pp., 2s. 6d. The Third Series, in Stiff Paper Cover, 9d. The Fourth Series, in Stiff Paper Cover, with Portrait of Faraday, 1s.

Yeast. Prof. Huxley, LL.D., F.R.S.
Coal Colours. Prof. Roscoe, F.R.S.
On the Origin of the English People. Prof. Wilkins, M.A.
Food for Plants. Professor Odling, F.R.S.
The Unconscious Action of the Brain. Dr. Carpenter, F.R.S.
On Epidemic Delusions. Dr. Carpenter, F.R.S.
On the Progress of Sanitary Science. Prof. Roscoe, F.R.S.

The Rainbow. Prof. Roscoe, F.R.S.
The Ice Age in Britain. Prf. Geikie, F.R.S.
The Sun and the Earth. Prof. Balfour Stewart, F.R.S.
Atoms. Prof. Clifford, M.A. Cambridge.
Flame. Prof. Core.
The Life of Faraday. Dr. J. H. Gladstone, F.R.S.
The Star Depths. R. A. Proctor, F.R.A.S.
Kent Cavern. William Pengelly, F.R.S.
Electrical Discoveries of Faraday. W. F Barrett, Esq.
Ancient and Modern Egypt; or, The Pyramids and the Suez Canal. Dr. Carpenter, F.R.S.

FIFTH AND SIXTH SERIES.—16 Lectures. Crown 8vo, cloth, 268pp., 2s. 6d. The Fifth Series, in Stiff Paper Cover, with Portrait of Liebig, 10d. The Sixth Series, with Portrait of Professor Huxley, 10d.

Polarisation of Light. William Spottiswoode, F.R.S
Fertilisation of Flowers. A. W. Bennett, M.A. B.Sc.F.L.S.
Parasites. T. Spencer Cobbold, M.D., F.R.S.
Gun Cotton. F. A. Abel, F.R.S., Royal Arsenal, Woolwich.
Animal Mechanics. S. M. Bradley, F.R.C.S.
The Senses. Prof. G. C. Robertson, M.A.
On Muscle and Nerve. Prof. Gamgee, M.D., F.R.S.
The Time that has Elapsed Since the Era of the Cave Men of Devonshire. William Pengelly, Esq., F.R.S.

Crystalline and Molecular Forces. Professor Tyndall, F.R.S.
John Dalton and his Atomic Theory. Prof. Roscoe, F.R.S
The Transit of Venus. William Huggins, D.C.L., LL.D., F.R.S.
Joseph Priestley: His Life and Chemical Work. Prf. Thorpe, F. R.S.E.
The Geographical Distribution of Mammals. P. L. Sclater, M.A., F.R.S.
Earthquakes and Volcanoes. Prof. W. C. Williamson, F.R.S.
Modern Savages. Sir John Lubbock, Bart. F.R.S., M.P.
Palestine Explorations. Major C. W. Wilson, R.E.

SEVENTH AND EIGHTH SERIES.—17 Lectures. Crown 8vo, cloth, 3s. 6d. The Seventh Series in Stiff Paper Cover, with Portrait of Henry Cavendish, 10d.

Arctic Discovery Capt. J. E. Davis, R.N., F.R.G.S.
Soap Bubbles. Prof. Rücker, Yorkshire College of Science.
The Birds of the Globe. R. Bowdler Sharpe, F.L.S., &c., of the British Museum.
The Great Extinct Quadrupeds. Professor P. Martin Duncan, F.R.S.
Cavendish and his Discoveries. Prof. Thorpe F.R.S.E.
The Functions of the Brain. Prof. Ferrier, M.D.
Food. Professor Henry E. Armstrong.
The Age of the Men of Kent's Cave. William Pengelly, F.R.S.

What the Earth is Composed of. Prof. Roscoe. Illustrated. 6d.
The Earth's Place in Nature. J. Norman Lockyer, F.R.S. Illus. 6d.
Life on the Earth. Prof. W. C. Williamson, F.R.S. Illustrated. 6d.

NINTH AND TENTH SERIES.—17 Lectures. Crown 8vo, cloth, 2s. 6d. The Ninth and Tenth Series may be had separately, in Stiff Paper Cover, 1s. each respectively.

The Beginnings of Life. Professor P. Martin Duncan, F.R.S. 2 Lectures. Illustrated.
Flame. Prof. Thorpe, F.R.S. 2 Lectures. Illustrated.
Modern Discoveries in Sound. Professor T. H. Core. 2 Lectures. Illustrated.
The Cruise of the Challenger. John Murray, F.R.S.E. 2 Lectures.

William Harvey, and the Discovery of the Circulation of the Blood. Professor Huxley, F.R.S. Illustrated.
The Sun. Prof. Roscoe, F.R.S. Illustrated.
The Aborigines of Tasmania an Extinct Race. Professor Flower, LL.D., F.R.S.
Insectivorous Plants. Prof. Williamson, F.R.S.
Edison, and Some of his Inventions. Professor Barrett, F.R S E. Illustrated.
Our Earliest Ancestors in Britain. Professor Boyd Dawkins, M.A., F.R.S.
Modern History of Gunpowder. Professor Abel, C.B., F R.S., Chemist to the War Department.
The Minutest Forms of Life. Rev. W. H. Dallinger, F.R.M.S. Illustrated.
Animal Intelligence. George J. Romanes, M.A., F.R.S.

ELEVENTH SERIES.—4 Lectures. Crown 8vo, Stiff Paper Cover, with Portrait of Darwin, 6d.

Islands, as Illustrating the Laws of the Geographical Distribution of Animals. Alfred R. Wallace, F.R.G.S., F.L.S. Illustrated.
The Age of Dragons. H. W. Hawkins, F.G.S.
Palestine in its Physical Aspects. Rev. Canon Tristram, LL.D., F.R.S.
Traps to Catch Sunbeams. Captain W. de W. Abney, F.R.S., R.E. Illustrated.

Heywood, Deansgate and Ridgefield, Manchester; and 11, Paternoster Buildings, London.